

FIG. 1

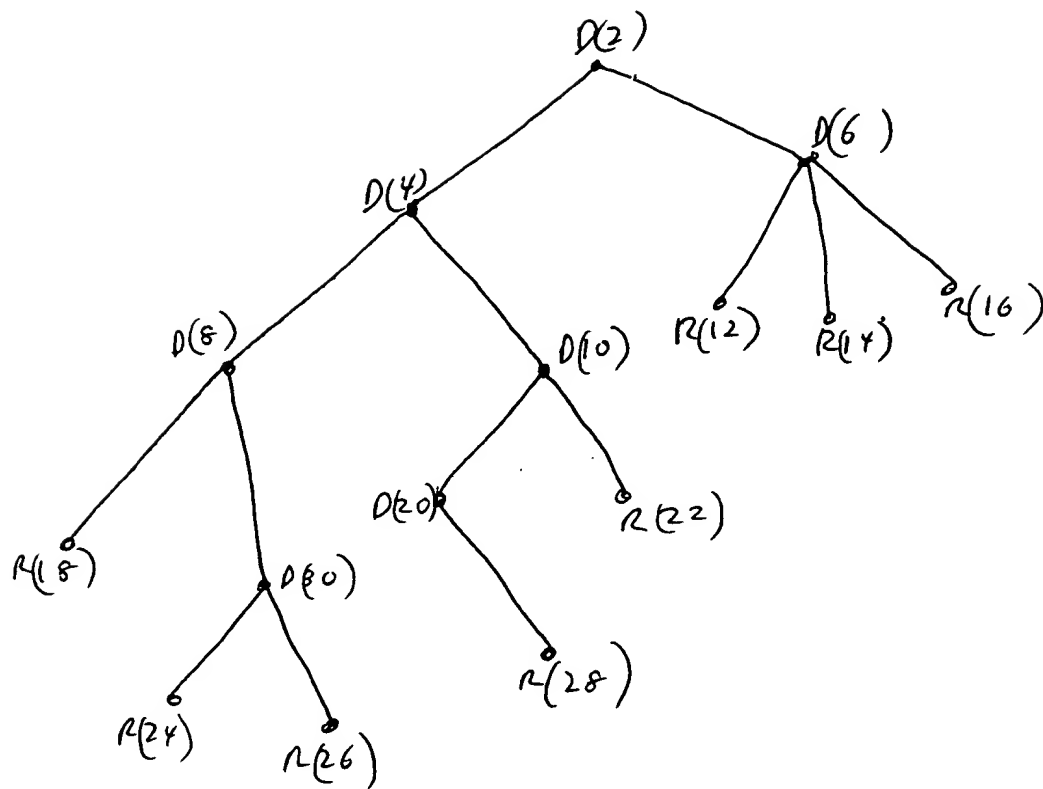


FIG-2

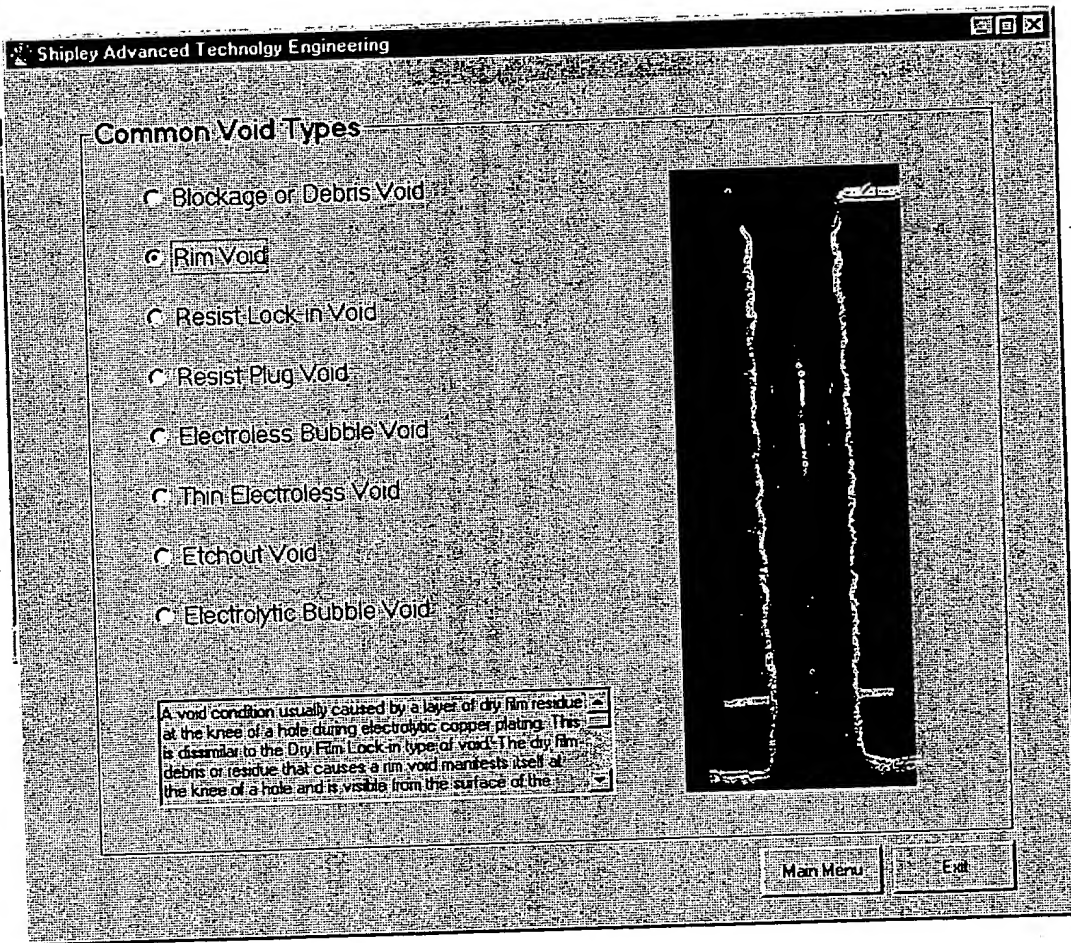



FIG. 3

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### Common Void Types

- ☐ Blockage or Debris Void
- ☐ Rim Void
- ☐ Resist Lock-in Void
- ☒ Resist Plug Void
- ☐ Electroless Bubble Void
- ☐ Thin Electroless Void
- ☐ Etchout Void
- ☐ Electrolytic Bubble Void

"Dry film plug" type voids occur when the electrolytic copper in a through hole is prevented from plating due to dry film blocking one or both ends of the hole. The dry film plug prevents solution from flowing through the hole trapping air or other matter inside the hole. The matter that remains in



Microscopic image of a through-hole plated with copper, showing a central void (Resist Plug Void) and several horizontal white lines (resist blocks) along the length of the hole.

Main Menu Exit

FIG. 4

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Process Description / Purpose Potential Failure Mode(s) Potential Effect(s) of Failure Severity Potential Cause(s) of Failure Occurrence Current Controls  
 Detection Risk Priority Number (RPN) Recommended Action(s) Process FMEA Checklist Main Menu Print Failure Modes Exit

Potential Failure Modes

☒ Voids ☐ ICDs ☐ Poor Adhesion ☐ Other

Selection Criteria / Potential Failure Modes

Etchout Voids  
 Resist Lock-in Voids  
 Resist Plug Voids  
 Debris / Blockage Voids  
 Thin Electroless Voids  
 Glass Area Voids

Potential Causes of Failure

1. Clogged dry film develop nozzles  
 2. Insufficient dry film develop filtration  
 3. Develop sump cleaning procedure / frequency  
 4. Insufficient pre-plate cleaner concentration  
 5. Insufficient pre-plate cleaner temperature  
 6. Insufficient pre-plate cleaner dwell

Potential Effect(s) of Failure

Electrical Functionality  
 Poor Continuity  
 System Reliability

Recommended Actions

Verify the proper cleaner dwell was utilized. Automatic hoist systems' timeways should be checked periodically. Changes are sometimes incorporated without full understanding of other tank dwells.

Suggested Controls

Process Control Plan  
 Equipment Preventive Maintenance Program  
 Operator Start-up Checklist  
 Operator Shut-down Checklist  
 Control Charts for Key Variables  
 Control Charts for Key Attributes

Relative FMEA Indices

Severity	8	Detectability	3
Occurrence	2	Risk Priority Number	48

FIG.5